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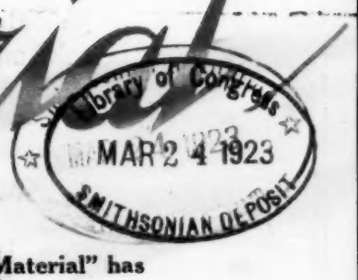
Lux Material



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ADVERTISERS' INDEX, PAGE 33

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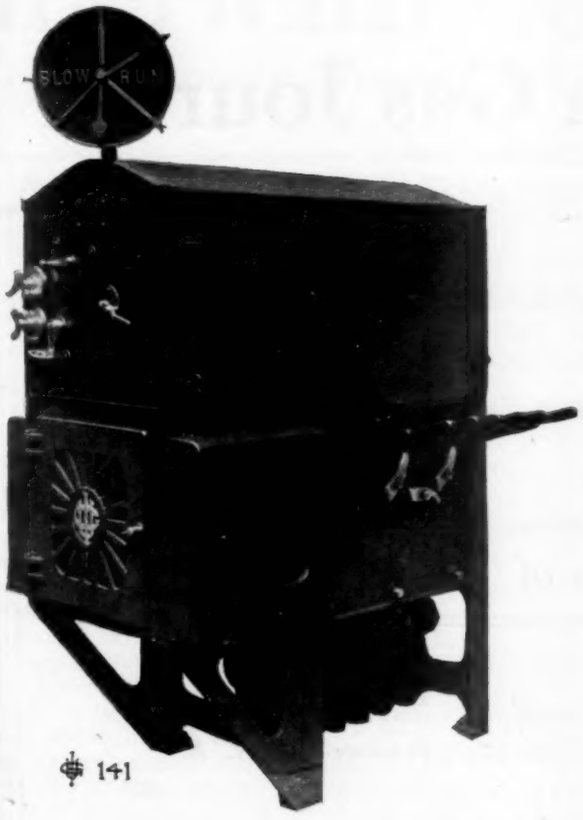
The KOPPERS COMPANY

PITTSBURGH, PA.



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It inspires confidence —

The U. G. I.
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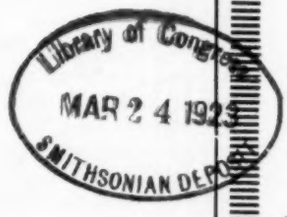
water gas apparatus



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THE U. G. I. CONTRACTING CO.

Broad & Arch Sts., Philadelphia

335 Peoples Gas Bldg., Chicago 928 Union Arcade, Pittsburgh

American Gas Journal

SIXTY-THIRD YEAR

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Direct Consumer Selling

HOW TO PUT OVER HOUSE-TO-HOUSE CAMPAIGN

By Harold Leslie

The building up of a successful, direct-to-the-user selling organization, for the resale of appliances, by the gas company, is not a difficult thing in itself.

It is by far the most productive method of selling appliances, considering the results obtainable in comparison with the time and investment required by other methods.

Its particular strength lies in the fact that it allows of actual demonstration of an appliance in the woman's own home, where she can much more readily visualize its possibilities than when the same appliance is shown her in the store.

We may safely assume that a buying desire lies dormant in the average woman or housewife when anything relating to an increasing of her comfort or the ease with which she does her work in the home is considered.

To arouse this dormant desire without loss of effort or money, simply means greater gas appliance sales.

That it can be accomplished by a minority of distributors with excellent results has been proved beyond shadow of doubt.

As the rules governing the matter are comparatively simple, and records of past and present successes by a few distributors are constantly brought to our attention, the question then presents itself why any distributor of gas appliances cannot safely undertake a consumer selling campaign with hope of moderate success at least.

As a matter of fact, he can with few exceptions.

The application of a modicum of common sense applies in this instance fully as forcefully as in any other form of a selling campaign.

The very first step to be considered is to be sure in the very beginning that a sufficient stock of appliances is not on the way to you from the manufacturer, but actually in your warehouse and ready for distribution.

Consumer selling is of necessity high pressure selling in a sense.

To arouse the desire to buy in a consumer and not to fulfill same almost at once by practically immediate delivery or to allow deliveries to drag after a house-to-house salesman has by hard plugging fought his way to a number of well-earned orders is absolutely deadly and may mean possible loss of the sale, to say nothing of the breaking down of the morale of the salesman, which is really your biggest asset.

Once the stock of appliances is assured, prior to the beginning of the campaign, the next step to be considered is the obtaining, if possible, the services of a competent crew manager.

Method Outlined

Failing in this, any sales manager should have no difficulty in obtaining very fair results after the following manner:

Assuming the present commander-of-sales is to take charge, his first step now is to obtain men.

An advertisement in the classified columns of a local newspaper, particularly in the vicinity of larger cities, will reach literally hundreds of men with more or less house-to-house selling experience in various lines of merchandise, as pianos, victrolas, vacuum cleaners, etc., etc.

These men all have the "feel" of the house-to-house selling game, so to speak.

Many Can Help with Prospect Lists

Many of them will have a carefully kept, up-to-date prospect list in the territories in which they have worked.

Some of them are to a certain extent "floaters," which is why they will answer your advertisement, but do not make the mistake of underrating them as a class.

I have seen an actual instance worked out very recently where a nationally known manufacturer advertised for house-to-house men. The high class of men who answered was truly amazing. The fact seems to be evident that a high-class proposition will attract a high class of men, whether in house-to-house selling or any other kind.

Some of these men will work successfully on straight commission, while others will require a small drawing account.

This is a matter of policy to be determined by yourself.

It is seldom that a definite line of procedure can be mapped out to cover all salesmen or all territories in any selling campaign. To be successful a selling campaign must be elastic.

Never be deterred because these men have been selling other lines than your own.

Remember, they have first learned through more or less experience to be more or less successful in

house-to-house selling and you can much more readily teach them your line than to teach them the game, generally speaking.

In the natural course of events a gradual sifting out process will take place among the men you finally assemble as crews.

With the merchandise on hand and the men acquired, your next step is the careful mapping out of the territory in sections to be worked by your various crews.

It is essential that each crew have the constant association, encouragement and helpful experience of a competent crew captain if the best results are to be obtained.

Enthusiasm will be the keynote of the campaign. Nothing helps to maintain it like a seasoned crew captain.

To refer back for a moment to my statement regarding supplying demand, it is an excellent idea when possible to travel a light delivery car with each crew well stocked with appliances and make immediate deliveries as sales are made and closed.

Aside from actual canvassing from house to house, leads or prospects may be obtained by special limited time and price concession sales advertised in local papers or the use of mailing lists with a return coupon feature.

We have said that principally on the enthusiasm of the men depends the success of a consumer selling campaign.

What can be done to assure a constant supply of enthusiasm in the men?

Creating Enthusiasm

One of the most successful distributors of appliances the writer ever met accomplishes this in various ways.

Perhaps the most effective of these is the proverbial plum method.

We are all susceptible to an incentive. It is a phase of human nature.

Something desirable just beyond our reach, but only obtainable as a result of increased effort on our part, will always spur us on to endeavor to obtain it.

The distributor the writer refers to always runs sales contests each month—not in a desultory or intermittent manner, but constantly and regularly. There is no let-up in the contests and apparently there is no let-up in the efforts of the men as a result.

The prizes offered vary from Eversharp pencils to cash prizes of varying amounts.

Another very effective manner in getting results from the men is to hold regular informal sales or experience meetings before a blackboard indicating the sales quotas assigned to the various men.

A Star Performer

Often in crews of house-to-house men there will be a man whose sales top the rest regularly and consistently—in other words, a star performer.

This man's performances, when considered in discussion with the progress being made in their quotas, usually brings home forcibly to the other men that he must have something which they have not, or be employing methods of which they are ignorant.

Then, if he is the right kind of a man, let him talk to the other men, whose respect for his ability will cause them to listen, and let him tell of the actual conditions even to the conversation involved in his getting the business he is credited with.

A certain percentage will either respond to his logic or his enthusiasm and endeavor as a result to emulate his successes.

A salesman's approach in house-to-house selling is one of the most diplomatic procedures imaginable.

A good approach is often the direct cause of a salesman's success, and a poor one the obvious reason for his failure.

A stereotyped approach never lands orders or even gets a man a hearing.

The moment a consumer salesman rings a doorbell he is faced with a psychological resistance which has been built up against him instinctively by the woman through habit.

If he can diplomatically penetrate this resistance and eventually gain her interest and if he knows his merchandise, he will win.

The man who is so sensitive as to fear an occasional sharply closed door in his face should never attempt the game.

There are some very signal successes in the consumer selling game and some very pitiful failures. There are usually very obvious reasons for both.

A very unusual instance of the rewards of persistence in house-to-house appliance selling came to the writer's attention recently.

An old hand at the game who had been successful for years was suddenly stricken by sickness and obliged to spend weeks in bed.

Telephone Selling

In the latter weeks of his convalescence, having full possession of his faculties, he became very restless and decided to try telephone selling.

Taking the loca lphone book, he chose names at random and called them up, explaining to the woman his illness, advising her whom he represented, and asking her if she owned one of the type of appliances which he sold. If she said no, he then asked permission to send her a pamphlet descriptive of same, and a few days later he would again call her, asking if she had received the pamphlet, her opinion of same, and if he might have the pleasure of calling and demonstrating to her the appliance after his health improved?

In this way he built up a large prospect list and eliminated many useless calls on people already owning appliances of the kind he sold.

Keeping the appliance well sold in consumer selling, the writer is convinced, is directly traceable to a proper demonstration in the beginning and a reasonable amount of willingness to give service afterwards—two very obvious but actually much neglected matters.

Transmitting Water Gas Under High Pressure

DISCUSSION OF SOME CONDENSATION LOSSES

By W. A. DUNKLEY, Illuminating Gas Engineer, Bureau of Mines

During the past year and a half the Western United Corporation of Aurora, Ill., has been distributing carburetted water gas from its Lockport, Ill., plant, to an extensive territory, under an initial pressure ranging up to 90 lbs. per sq. in. The most distant distributing point on the system is at Harvard, Ill., about 85 miles from the plant. The territory supplied is approximately 85 miles long and 35 miles wide, the total mileage of mains being 1,223, or approximately 24 per cent of all the gas mains in Illinois outside the city of Chicago.

Gas Distribution Losses

With so extensive a distribution system and so high an initial pressure, it is not surprising that the unaccounted for gas, or excess of production over sales, should be higher than in a small low pressure system. In a fairly good system of the latter type, the excess of production over sales is seldom less than 5 or 6 per cent, and instances are by no means uncommon where the unaccounted loss is double this figure. In the Western United System the unaccounted for gas for a time was in the neighborhood of 20 per cent. The management, ever on the alert to improve conditions, undertook an investigation to determine, if possible, the probable sources of loss. The problem is by no means as simple as it might seem. Not all the apparent loss of gas is due to actual leaks in the distribution system. Among the causes which may contribute to show a loss of gas are the following:

1. The plant meter which measures the gas produced may be registering too fast.
2. A majority of the consumers' meters may be too slow.
3. The gas may be metered at the plant fully saturated with water and condensible hydrocarbon vapors. Due to cooling and compression, some of these vapors are condensed, run into drips and are removed from the system. The gas upon re-expanding is unsaturated and has a smaller volume than the gas metered at the plant.
4. The gas may be metered at a lower average temperature at the consumers' meters than at the plant meter, hence by Charles' law the volume registered by the consumers' meters would be less.
5. The consumers' meters in a large system cannot all be read simultaneously, hence only by a rather complicated and somewhat unsatisfactory computation can the average amount of gas sold during a definite period of time be determined for comparison with the amount of gas as measured by the plant meter during the same period of time.
6. In certain localities gas is used in street lights unmetered, hence the consumption must be calculated. This is not the case, however, in the Western United Corporation system.
7. Some gas is always lost through undetected defects in mains and services. This loss increases roughly as the square root of the absolute pressure increases, therefore, with a pressure of 75 lbs. gage or about 90 lbs. absolute, the loss through leakage would probably be about double what it would be were the pressure in the mains, but slightly above atmospheric as in low-pressure systems. Since all the mains are underground and the high-pressure transmission lines lie for the most part in the rural districts between towns, small leaks are not readily detectable.

In view of the many conditions affecting the unaccounted for gas, an effort to reduce or account for such gas must be systematic. The field may be narrowed by investigation and eliminating those conditions which are comparatively insignificant in magnitude.

Losses Due to Condensation

As a part of the study the writer investigated the third item, namely, the effect of removing condensable hydrocarbons and water vapor, upon the volume of the gas as sent out through the plant station meter.

The other items of the main problem, while doubtless of greater magnitude, were such as could be solved only by the combined effort of the various departments of the organization. They were items with which the operating, distribution and accounting departments were more familiar. The item of condensation was, on the other hand, one of uncertain value, and it was desired to learn whether this was of sufficient importance to be considered under the existing conditions.

Water Vapor in Gas at the Plant

The first step in the problem was to determine the degree of saturation of the gas as metered at the plant. The saturation, with water vapor, was determined by inserting wet and dry bulb thermometers in the gas main immediately ahead of the meter. The dry bulb thermometer at this point averaged 96.0 degrees and the wet bulb 92.7 degrees. According to dew point tables, the dew point corresponding to these readings would be 91.7 degrees. At this temperature the gas would contain about 5.6 per cent of its total volume as water vapor. However, the electric gas meter used, automatically corrects gas volume to volume saturated with water vapor at 60 deg. F. if the gas is

in fact saturated with water vapor above 60 deg. F. Therefore, according to the humidity tables, the outgoing gas must be considered as carrying 1.72 per cent of its volume as water vapor. The dew point as determined at this point only served to show that the gas was saturated with water vapor at the lower temperature to which the gas volume was automatically corrected.

Gas after leaving the electric gas meter passes into a 2 million cu. ft. holder, whence it is pumped by a large two-stage compressor into the distribution system. At the four large distribution centers, Joliet, Aurora, Elgin and LaGrange, there are distribution holders, into which gas is admitted from the high pressure mains as needed and distributed thence through low pressure governors to the surrounding territory. Not all of the gas supplied to the territory of the company passes through the low pressure distribution system fed by the holders. An examination of the sales summary shows that of the 153 million cubic feet of gas sold during July, 1922, approximately 94.5 millions were distributed as high pressure gas, the pressure being reduced through district governors and in some places through individual house governors on the consumers' premises. Included in the 153 million feet, approximately 27 million cu. ft. were made at the small plant at Aurora. Therefore, of the 126 million cu. ft. sent out by the main plant at Lockport, approximately 94.5 millions or 75 per cent is distributed as high-pressure gas. A portion of this had been reduced in pressure in the gas holders at Elgin and then repumped at high pressure.

With the conditions as just given, the problem resolved itself into the determination of the humidity of the low pressure and high-pressure gas at various points in the system to ascertain to what extent the gas was saturated with water vapor at the consumers' meters. It was not considered necessary to make tests at a very large number of points, but the points were so selected as to give data for the gas known to have been produced at the main plant. Tests were made at the low pressure distribution centers, Elgin, LaGrange and Joliet. No tests were made at Aurora or on the lines going out of Aurora, since these were supplied chiefly with gas made in the Aurora plant.

Apparatus Used

In a few instances where conditions were favorable for inserting thermometers into the gas mains, the humidity of the gas was determined by the use of wet and dry bulb thermometers as at the plant. Where this procedure was not convenient, a dew point apparatus was employed. Briefly stated, the operation of the instrument consists in passing a current of the gas up through the annular space between the outer glass jacket and the inner tube. A portion of the gas, amount regulated by a needle valve, bubbles through pentane, ether or some other easily volatile liquid in the inner tube. The evaporation cools the tube and when the temperature drops to the temperature at which the gas in the annular space is saturated with vapor, a film of condensate forms on the outside of the inner tube. The temperature at which this film forms is read by a sensitive thermometer dipping in the volatile liquid. The flow of gas through the liquid is then interrupted, and as the temperature rises the film evaporates. The temperature at which it disappears is noted, and the average between the temperatures of appearance and disappearance is taken as the dew point. During a test the apparatus is screwed onto an ordinary ⅛ in. gas connection and gas may be burned at the burner. Obviously, the instrument cannot be used when the temperature of the atmosphere is cooler than the dew point of the gas. Two scrubber tubes contain granulated calcium chloride and ordinary rubber bands respectively. The flow of gas can proceed directly into the apparatus or through either one of these tubes according to the position of the cock. Ordinarily, the gas would be saturated with water and condensible hydrocarbon vapors at the same temperature, but if, for example, it were desired to determine the hydrocarbon dew point of a gas which had been in contact with water at a higher temperature than that at which condensed water and hydrocarbons had previously been removed, the gas could first be passed through the calcium chloride to remove a considerable portion of the water vapor present, thereby reducing the water-vapor dew point of the gas below the hydrocarbon dew point and the latter could be determined on the dried gas in the usual manner. Similarly, the water dew point could be determined in the presence of a high degree of hydrocarbon saturation, by removing a portion of the latter in the tube containing rubber bands in a similar manner.

Dew Points Determined

Low pressure gas from holders	Temp. deg. F.	Percentage water vapor in gas by volume
Joliet—Outlet holder	72	2.68
Gas office	71	2.60
Elgin—Outlet holder	66.5	2.21
LaGrange—Outlet holder...	70.5	2.51
Office	55.0	1.43*
Average.....		2.50
High pressure gas through governors		
Hinsdale	38	0.82
Downers Grove	47	1.09
Plainfield	44.5	1.00
Batavia (gas repumped at Elgin)	36.0	0.76
Dundee (gas repumped at Elgin)	40.0	0.87
Elgin (gas repumped).....	25.0	0.46
Average.....		0.83

*This value was not included in the average since it was learned that the gas at this point might be either from high pressure or low pressure system or a mixture of the two.

Since 75 per cent of the gas sent out from the main plant is distributed from high-pressure mains, the weighted average water vapor content would be 1.25 per cent of the gas by volume and since the gas as metered at the plant contained only 1.72 per cent of water vapor, the net volume actually lost by condensation of water vapor was only 0.47 per cent, an

almost negligible amount compared with the total losses.

Losses Due to Condensation of Hydrocarbons

In determining the losses due to the condensation of hydrocarbon vapors, it did not seem feasible to use the same method as employed for water vapor. It would have been possible to determine the hydrocarbon dew point at various parts of the system and these dew points would probably have shown fairly close agreement since the condensate was removed from the gas and there was, in summer weather, no subsequent contact of the gas with hydrocarbons, whereby they could be again picked up. However, the hydrocarbons condensate is a mixture of hydrocarbons, chiefly of the benzol series, so its vapor tension was not known, and therefore there were no available tables from which the volume of the vapors could be readily ascertained.

Since a considerable portion of the total oil condensate was dropped out of the gas at or near the plant after compression and was collected in a tank for sale, it was decided that the most feasible plan was to measure the total condensate collected over a known period, determine its vapor density and compute therefrom the percentage of condensible hydrocarbon vapors in terms of the total volume of gas sent out during the same period. Much water was collected from the drips along with the oil and this was separated from the oil by gravity. A composite sample of the oil from all the drips was collected. Individual samples were also taken from drips at intervals along the transmission lines. It was found that all the condensate was removed within a distance of about 10 miles from the plant. That which was not so removed evaporated with reduction of the gas pressure. The composite sample of drip oil gave the following straight distillation test. The distillation was made in a 250 c. c. Engler flask.

Results of Distillation Test.

(Specific gravity at 60 deg. F. 0.900)

Temp. deg. C.	CC
First drop 95	over
95—105	9.0
105—115	12.5
115—125	13.5
125—135	13.5
135—145	10.0
145—155	11.0
155—165	8.0
165—175	6.5
175—185	4.5
185—195	2.5
Dry at 200	

There was a little naphthalene present in condenser at close of distillation.

Vapor Density of Oil Condensate

The vapor density of the oil condensate was determined by the Victor Meyer apparatus. The outer jacket of this apparatus contained glycerin, which boils at a temperature of 290 deg. C. The side outlet of the inner tube was connected to the gas burette in which water was the containing liquid. The oil to be tested, to the amount of about 0.2 gram was weighed in a little bulb of thin glass and placed in the apparatus above the cock. The top of the tube was then tightly stoppered. When the glycerin in the outer jacket had been boiling several minutes, the burette was read and the bulb of oil was dropped by means of the cock and broke in the tube, the oil quickly vaporized and the air displaced was measured in the burette. The temperature in the jacket of the burette and the barometric pressure were also read. The volume of air displaced was equal to the volume of vapor formed from a known weight of the oil, hence the volume of vapor at 60 deg. F. and 30 inches barometer equivalent to the total condensate collected could be computed. It was found from several determinations that the volume of vapor per gallon of condensate averaged about 26.5 cubic feet at 60 deg. F. and 30 inches barometric pressure. The total volume of oil condensate collected from 36,993,000 cubic feet of gas was 2,400 gallons, equivalent to 63,600 cubic feet of vapor, or approximately 0.17 per cent.

From the drips beyond those yielding oil was obtained a heavy molasses-like liquid having a peculiar odor and high viscosity. The color of this liquid was nearly black and to the casual observer it would appear to be tar. That it was not tar was evident from a number of considerations. It was obtained from purified gas. It was not found in the drips near the plant. It was almost insoluble in light oils, benzol and carbon bisulphide. It had a different odor from that of tar and was much more viscous.

The substance was soluble in alkalies and it or one of its derivatives was precipitated from the alkaline solution by neutralization with acid. The substance has not been identified chemically, but appears to be of an acidic nature and resembles in all respects the gums deposited in consumers' meters, which were discussed in the paper by Dr. Ralph L. Brown presented at the recent convention of the American Gas Association. It appears to be formed by the polymerization or chemical condensation of certain compounds which are present in the gas in a gaseous or vapor form. The presence of free oxygen in the gas, according to Dr. Brown, promotes the formation of these gummy substances.

The substance upon being heated in a flat open dish swelled up enormously, gave off combustible vapors and left a large volume of light carbon. When this carbon residue was burned there remained in the crucible a considerable amount of red ash which appeared to be chiefly oxide of iron. So far as could be ascertained, the conditions were favorable for the complete deposition of this gummy material in the high pressure system, none going forward to the consumers' meters. Since the mains in the system follow more or less closely the contour of the country, which is somewhat rolling, it appears likely that there is considerable opportunity for the flow of condensate down-grade to drips counter to the direction of gas flow. It may be that the chemical action which results in the formation of the gums is promoted by this dephlegmating action.

Loss of Heat Value Due to Compression

The figures obtained are interesting in another way, viz., in giving a check on the loss of B. t. u. of the gas due to compression. There were no facilities available for determining the exact value of the condensate. The distillation test as well as the vapor density indicate that the average composition of the condensate is near to that of meta-xylene, the heating value of which is 18,410 B. t. u. per pound. Assuming this value, the heat represented by the condensate would be 1,380,750 B. t. u. per gallon, equivalent to about 9 B. t. u. per cubic foot of gas sent out. This seems to check quite closely with the observed loss as determined by the calorimeter during the summer season.

Conclusions

From the foregoing the following conclusions seem warranted.

1. So far as reduction in gas volume is concerned, the condensate (both water and oil) removed from the gas by compression up to 75 lbs. per square inch, is negligible, assuming that the gas as metered at the plant is corrected to volume if saturated with water vapor at 60 deg. F. If this correction were not made and the gas were metered at a considerably higher temperature, as, for example, around 90 deg. F., together with the additional drying due to cooling and compression which might occur during severe winter weather, the volume decrease might be as much as 5 per cent. Since the correction tables used by practically all gas companies take the humidity of the gas into account in the factors given for temperature and pressure, it is quite safe to assume that such conditions would seldom or never occur. In winter the volume of oil condensate in the system under consideration or under similar conditions would doubtless increase somewhat, but even were it doubled or trebled, the effect on gas volume would be negligible.

2. The effect on heating value of the gas is somewhat more marked. The decrease of 9 B. t. u. per cubic foot represents a drop of about 1.6 per cent. In winter this might be increased considerably, since more of the benzol and toluol would doubtless be condensed out of the gas. In fact, as much as 35 B. t. u., or 6 per cent, of the heating value of the outgoing gas has been lost at times in the system studied.

3. At the time when humidity tests were made, the average basement temperature observed was about 78 deg. F. Assuming that the consumers' meters averaged correct at 60 deg. F., the loss in volume due to difference in temperature during the summer season would be negative by about 4.7 per cent. In the winter time, on the other hand, the correction would doubtless be the other way.

4. The main problem of determining the cause of unaccounted for production in this and similar systems is thus solved only in so far as it is shown that loss due to condensation is a practically negligible factor.—Reports of Investigations, U. S. Bureau of Mines.

V. E. Bird Predicts Great Growth for Industry*

Tells New England Association Future Holds Wonderful Possibilities

By V. E. BIRD

For the last six months we have been in the throes of a coal scarcity hardly less serious in its nature and extent than any experienced during the trying years of the war. But our industry has weathered the storm successfully, and it now seems likely that the climax of this shortage has been reached and passed, and that the near future will see a return towards normalcy as far as available quantity as well as price of coal is concerned, so that we may look forward towards the expansion of our industry during the coming year under circumstances which at the present moment would seem favorable. Either through experience or otherwise, we all know that one of the great problems which during this coal crisis confronted so many of the companies manufacturing coal gas, has been that of using English coals. This experience has not been without its value, but has been most varied, due to the lack of uniformity in the quality of the coal shipments which have come to this country. The variation appears to have been all the way from coal of a very satisfactory quality to coal which it was very nearly impossible to use at all. On the whole, however, I believe it is safe to say that the experience has not been such as would lead anyone to seek their gas coal supply in the English market out of preference; nor does it, fortunately, seem likely that we will be forced to do so.

To the companies manufacturing water gas and oil gas the lower cost of fuel and gas oils which has been prevalent during the year has been in the nature of a very distinct relief, in contrast to the higher prices of generator fuel.

The development of our industry during the year has been, I think, decidedly encouraging, and of a nature which gives promise of continued and even augmented growth during the year or even years to come. For most of the Gas Companies the first months of 1922 showed a loss in output as compared with the corresponding period of 1921. However, as the year progressed this rather discouraging condition changed into one of steady and increasing growth over the corresponding period of the previous year, so that official figures of manufactured gas sales for 1922 show about a 10 per cent increase over 1921 when aggregate sales for the country reached the high water mark in the comparatively short life of our industry of 326,000,000,000 cu. ft.

*Extracts from President's address at annual convention, New England Association of Gas Engineers.

This is, indeed, encouraging and yet it is no more than keeping pace with the rate of growth of the past decades.

Looks for Greater Growth in Future

As for the future I look to see this rate of growth not only maintained but accelerated through a consistent, persistent and intensive development of the industrial field, the surface of which we have only scratched. On this point, statistics compiled by the American Gas Association show that 78 per cent of our business is at the present time residential, or of a retail nature; whereas, only 22 per cent is industrial or of a wholesale nature. When we reflect upon the true significance of these figures, and at the same time consider the immensity of the industrial field with its more than 1,200 ways in which gas may be made use of in our industries, is it not at once apparent that here lies an almost unprecedented opportunity for our sales and engineering organizations.

Being connected with a combination company, I cannot in this connection refrain from drawing a comparison between the gas and electric industry in which latter conditions are almost exactly reversed; with more nearly 75 per cent of the nation's electric output being used industrially, and the balance being disposed of at retail for household use and lighting in general. Moreover, and this also should be immensely significant to us, the industrial load of the electric companies constitutes today the very backbone of this industry.

To secure the greatest development of the industrial gas business it is, however, essential that we should apply the same scientific principles of rate making to our gas rates as have been applied to electric rates in order that each type of consumer may stand his proper and equitable share of our costs. Great strides have already been made in this direction, and yet much is left to be done; and it becomes all the more of an important problem for us to solve when we reflect that the time has passed when rates can be increased materially for any group of our consumers.

Reduced Cost of Manufacture Necessary

The key to the growth of our industry lies therefore very largely, it seems to me, in lower costs of generation of the product which we wish to sell, and with the cost of raw materials not likely to be decreasing materially, we can solve this problem only through improved efficiencies of our generating apparatus, and increased economies throughout all of our operations.

It used to be said that the trouble with the gas industry was that it did not have adequate brains in its engineering staffs to cope with the problems confronting the industry. This may or may not have been true some years ago, but that time has passed, and today I think it is certainly true that engineering and chemical talent of the highest order is being devoted to the solution of the many complex problems confronting us in the construction of our generating plants, as well as in the operation of them afterwards. Tremendous strides have been made in the construction of coal gas as well as water gas apparatus, and to perfect the mechanical operation of both types, thereby eliminating the very frequently troublesome personal equation of the operator in the old type of gas apparatus. Moreover, with all of the experiments which are being carried on today in this direction, it is not an empty hope to look for still greater achievements in the not far distant future.

Uniform Classification of Accounts*

WHAT IT MEANS TO UTILITY OPERATORS

By M. F. Reeder, Peoples Gas Light & Coke Co., Chicago

The utility of any instrument will depend entirely upon its use. An ordinary mazda light bulb is of no practical value as a detector on a radio receiving set, but it is the acme of efficiency for lighting purposes. An automobile is of no real value to the owner, if it is not operated, but genuine pleasure and comfort may be derived if it is put to the proper use.

The same is true of Accounting Classification. All the classification which it is possible to provide will not contribute to the success of a business if it is not properly used. Do not infer from the last statement that accounting methods alone will make your business a success, but proper accounting properly used will provide utility operators with the information necessary for successful operation. In a great many cases the difference between success and failure in business will be revealed by accurate accounting methods. Simplicity and accuracy in accounting is the ultimate goal toward which all business must strive, for in the last analysis the figures produced by the Accounting Department should act as the barometer which regulates the activities of business.

Before an accounting system may be termed a success it must succeed in establishing a feeling of confidence upon the part of the executives who are directing the business. That goal reached, the system of accounts used will be justifying its existence and unless such is the case accounting is of little potential value to business men. Thus the men in any corporation who have under their control the accounts should endeavor to establish beyond a doubt this feeling of executive faith that the accounts are providing a true statement of the operations of the business. This must be especially true in the case of cost accounts.

During the past fifteen years there have been thousands of cost systems established in both large

* Paper presented at Illinois Gas Association Convention.

and small businesses. It is safe to say that out of the thousands of installations made only a small percentage have become real barometers for the executives of the company. Now why is that the case? The chief answer is to be found in the fact that executive confidence was not established. Perhaps the installation was not without its faults. Undoubtedly the first figures produced were not entirely satisfactory, but if the official in charge of accounts is alive to his responsibility, it is a relatively easy matter to adjust accounts so that they will furnish correct figures that can be absolutely depended upon.

How can this be accomplished?

Every corporation of any size, if it is following the accepted ideas of corporate organization, is divided into functional departments. The Accounting Department is one of those functional groups, but it is not the corporation. The accuracy of the statements which it produces depends primarily upon the reports furnished by other departments of the corporate organization. In other words, the Accounting Department must depend upon others to give to it the data necessary to compile the financial reports and cost statements. If original reports are inaccurate, how can the Accounting Department produce reliable cost statements? The solution to the problem is outside of the Accounting Department.

Co-operation Needed

The official in charge of accounts may know all there is to know about accounting, both in theory and practice, but what does the average accountant know about the construction of a generator house? What does he know about the laying of a gas main or of the building of an electric transmission line? He knows that labor must be expended, material must be used and overhead charges incurred, but what should be the proportion of each? His ideas are too general to be of much practical value.

On the other hand, the engineer in charge of construction knows all about his end of the business but usually little about accounting. The same condition exists where the operating department is concerned. If the above analysis is correct there is only one solution to the problem and that resolves itself into one word—co-operation.

Before attempting to provide detailed cost classification on construction or operating projects, the accountant must consult the engineer and in like manner the engineer must take his accounting problems to the accountant.

Pull together and as a result the executives will know that the cost data furnished is accurate and complete.

Let us suppose for a moment that co-operation between the accountant and the engineer is lacking. The accountant furnishes the cost report to the operating executive. This gentleman reads the statement and discovers that operating costs have increased without any apparent justification. He calls into conference the operating engineer and asks for an explanation. The engineer reports that the cost as reported is incorrect. Why that figure cannot possibly be right, the Accounting Department must be in error. What follows? The cost figures must be analyzed and proven correct. This results in increased costs and duplication of effort which can be avoided by proper co-operation.

Undoubtedly the accounting end of the business has not instilled a feeling of confidence even though the cost figures are proven correct as reported. On the other hand friction with the operating department is sure to develop. Proper co-operation will eliminate such incidents.

The new Accounting Classification recently adopted by gas and electric utilities is today in the same position as a new man in your organization. Strictly speaking it is on trial, and before it will be accepted as an unqualified success it must secure the confidence of those who must use the figures produced.

The men who did the bulk of the planning which resulted in the new system frankly admit that it is not without its defects. Mr. Mathews, Statistician for the Railroad Commission of Wisconsin, in an article published in the January number of the American Gas Association Monthly, advises that changes will without doubt have to be made, but it will be a relatively easy matter to secure the co-operation of state commissions when constructive changes are suggested. If you have not already studied the article referred to it will be to your advantage to do so, as it gives a comprehensive statement of the attitude of a very able man who is connected with a state governmental agency.

It would perhaps be very uninteresting to this group of men to discuss the new prescribed classification. Suffice to say that we have it, it is obviously not ideal, but there is no reason why we cannot secure any desired result if we study the system and make a proper subdivision of the accounts prescribed.

Adopting a System

Assuming that we will by co-operation with governmental bodies succeed in evolving an ideal system, what is to follow?

Let us observe for a moment the present status of uniform cost systems in other industries. During the past decade there has been a concerted effort on the part of trade associations to secure the adoption by member firms of uniform accounting methods. The idea which dominated this move is expressed in the following statement appearing in a Department of Commerce publication, The Glass Industry, written in 1917:

"He suggests that manufacturers, acting together, should publish the results of a study of their predetermined costs for the benefit of themselves as well as of their uninformed competitors. He says that this accurate knowledge of the lowest costs which have been obtained would result in a decrease of price cutting. Such data, if accessible to all manufacturers, would, in his opinion, cause them to fix selling prices with much greater uniformity than has been customary."

The predominant idea from this statement seems to be the use of cost data as a means of eliminating

competition by fixing uniform selling prices. Such procedure does not harmonize with our present anti-trust legislation.

The United States Supreme Court, in the case of American Column and Lumber Co. et al. vs. United States of America, held unlawful certain practices along this line being followed by the American Hardwood Association, but the case did not definitely state the extent to which associations may contribute their information to a common center for joint uses.

Mr. Hoover, Secretary of Commerce, in a letter to the Attorney General, asked for an informal opinion upon many points, one of which was as follows:

(1) May a trade association provide for its members a standard uniform system of cost accounting and recommend its use, provided that the costs so arrived at by the uniform methods are not furnished by the members to each other, or by members to the association and by the latter to the individual members?

As the question is stated it clearly assumes that the disseminating of cost information to association members is an illegal procedure. It is apparent that if one looks at the situation from a common-sense business basis or from the standpoint of public policy we should not outlaw any movement which will result in better business methods.

The public will ultimately be benefited, as all manufacturers will strive to bring their costs to as low an average as possible, and in most cases lower costs will be reflected in lower selling prices.

Now you may ask how does this affect the utility operator? Utility companies are controlled by statute. Their rate of earning is fixed by governmental bodies.

Such being true, is it not logical to assume that there can be no legal obstacle in the way of distributing to one another any cost information which utility operators desire to secure for comparison or other purposes?

13 States Have Adopted Classification

To date thirteen (13) state commissions have adopted or are considering the adoption of the new classification, and it is reasonable to assume that as time passes the system will become more widely used.

Even today with only one-fourth of the states having adopted the system there is no question but that comparative cost reports would produce very tangible results. The monthly comparative statements which are prepared within a corporation do provide the management with very much useful data, but in the last analysis are they adequate? In looking over a statement the executive may see that production costs have increased over last month. He immediately asks why. A reasonable explanation is given. The incident is closed.

At the same time there may be another utility, operating under comparable conditions in another state, or in another community in the same state, whose production costs are say 15 per cent less than those accepted by the executive in question. Why should he be content with his costs if they are not as low as those of another concern operating under comparable conditions? If he had at hand information which proved beyond a doubt that his costs should be less, is it not reasonable to suppose that he could more efficiently operate his own business? By accurate comparative reports the management of a utility will be able to reduce waste, by improving operating methods and know that he is formulating his policies as a result of reliable information.

While it is true that business executives are always extremely busy and do not desire to be bothered with unnecessary details, it is also equally true that they welcome added information which will make possible sound business policies which under present conditions do not always materialize.

The utility operators have available all the machinery necessary to prepare and distribute among themselves the reports in question. The Illinois associations could easily secure reports from the various companies within the state. From these individual reports a composite cost figure can be secured with very little added expenditure. This composite report can be sent out by the Association to the member companies.

State associations can forward to the national association the composite report, and the national association can prepare a composite report for all the states to be distributed to all members of the National Association. Thus utility executives would be provided with comparable composite cost figures for both state and national operations.

The added expense will be entirely within the association group and not directly to individual companies, the cost to each company being in increased association dues which, when spread over all concerned, would not prove a heavy burden.

Such a plan as this would be practical only if the utility operators will co-operate with one another, but there is no doubt that the necessary co-operation can be secured.

Assuming that the suggested plan is feasible, what can be gained thereby?

In the first place, the goal which the utility companies will strive to reach will be the lowest cost figures which the composite statement shows for those companies operating under analogous conditions.

Secondly, the most efficient methods of operation will be adopted and the cost of utility products to consumers will be brought to a minimum basis.

Third, the value of accurate costs in presenting a company's case in a rate hearing is incalculable. Any utility cited to appear before a state governmental body and show why its rates should not be reduced need have no fear of the outcome if the cost figures supplied are accurate, and if it can be shown by comparison that that they are as low as those of another company operating under similar conditions whose costs have been compiled with an accounting system similar to its own. Such testimony is proof positive to any reasonable man, and we know that the members of state commissions are reasonable men.

Uniform accounting is an absolute necessity under governmental supervision, but I thoroughly believe that utility operators should take advantage of the added opportunity it offers and secure from one another comparative cost figures.

Gasification of Low Calorific Combustibles

A PROCESS FOR PRODUCING GAS FROM DUST, GARBAGE, ETC.

By Ernst Wolff, Chemiker-Zeitung, 1922, 1057-59

The question of the gasification of combustible matter of low calorific power will first be described in some detail and then particular attention will be paid to the production of gas from house refuse. The work, which was done by the writer on this subject has extended over a period of more than two years. The use of other fuel besides coal for the production of gas is important where and when there is a shortage of coal. It is also of significance in lowering the cost of gas and in affording a means of getting rid of apparently useless waste materials by converting them into valuable products.

The first problem was to devise a process and apparatus which are able to handle these low calorific power combustibles, which for most part contain a considerable percentage of water, and which yield a residual mass, very poorly suited for gasification. The process must be economical and the de-gasified residue must also be used for the production of the quantity of heat required for the drying and the gasification process.

As is known, in the gasification of coal, a certain amount of coke is consumed, in that the fuel is converted into gas, that is, producer gas, which is utilized for heating the retorts, containing the coal that is being gasified. This consumption of coke plays an important role in the economy of the gasification process. The problem of consumption of combustible for heating the retorts is of special significance in the gasification of low calorific power fuels and is later discussed in detail in the case of garbage. The author conceived of the idea of utilizing the de-gasified residue from the production of gas from waste materials for heating the retorts by first briquetting it with tar, pitch and in certain cases with other binding agents.

It looked hardly possible to obtain gas from waste materials, mixtures of kitchen refuse, sweepings, rubbish of different sorts, slag and clinker, ash and the like. But, when this matter was investigated further, it was found that such was the case. Although it is natural that much less gas can be obtained from these raw products than from gas coal, for example, nevertheless, a sufficient amount of the same is produced and a valuable gas under certain suitable gasification conditions.

In the first place, small scale experiments were carried out with these refuse materials, so as to determine whether it was possible to convert them into gas under any conditions; in these experiments no attention was given to the question as to how to apply the results to large scale operation. The gasification was carried out in an iron vessel, which held about two liters. The heating of the vessel was accomplished by inserting it into a gas oven. For the experiments sorted garbage and waste products were utilized. The sorted materials contained about 28 per cent inorganic material, mostly ash and about 53 per cent of water. The remainder was organic matter. The results that were obtained in the experiments should not be considered as average values, because of the widely variable composition of the material treated, but should be used as a general example of the possibility of working up such materials into gas.

Experimental Results Obtained

From one kilogram of the refuse materials there were obtained 25 liters of gas, which had a heat value of 3820 calories per cubic meter at a maximum at 0 degrees C and 760 millimeters pressure. The composition of the gas was as follows: 51.1 per cent of carbon dioxide, 3.4 per cent of heavy hydrocarbons, 8.3 per cent of carbon monoxide, 7.2 per cent of hydrogen, 24.4 per cent of methane and 5.6 per cent of nitrogen. These figures are for an air-free gas.

At the beginning of the gasification process the carbon dioxide content amounted to about 75 per cent. From the figures given above it may be seen that the carbon dioxide content of the gas is very high, but it is also evident that the gas contains a considerable amount of valuable hydrocarbons. In order to obtain a gas with a higher content of hydrocarbons, certain temperatures must be maintained in the process. In the aforementioned experiments the operations were carried out at a temperature which at the conclusion of the gasification reached 500 degrees C within the interior of the gasification apparatus. At higher temperatures a gas of different composition was obtained, due to the fact that an increased formation of hydrogen resulted with corresponding decrease in the percentage of hydrocarbons in the gas.

Hence, the garbage or waste materials behave in a similar manner to coal. In the production of gas from coal, hydrogen is formed at the expense of the hydrocarbons. However, in gasifying sweepings and other refuse materials, this phenomenon takes place at a considerably lower temperature than in the case of coal. The decomposition of the hydrocarbons begins at about 350 degrees C. The reason for this is that in the gasification of refuse materials at higher temperatures—which, however, are always lower than the ones prevalent in the gasification of coal—a gas is produced with a considerably higher hydrogen content. This must be explained as being due to the different composition of the raw materials, and not to different constitution of the hydrocarbons that are formed in the gasification. Decomposition of the waste materials begins to take place at 145 degrees C. and at 500 degrees C the process is almost completed. The time consumed is about two hours. Gas coal (Saar coal)

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As the Journal Views It

CO-OPERATION IN OUR INDUSTRY

Never has the spirit of co-operation that exists in the gas industry been more clearly demonstrated than in the attendance that has been reported by every state association at the various conventions held recently. In practically every case actual count showed that more gasmen have attended these gatherings than ever before. It proved too that gas company executives appreciate these opportunities to get together and discuss mutual problems.

Another feature which has caused favorable comment has been the character of the papers presented. These addresses have covered a wide variety of subjects all of them having important bearing on the successful operation of a company and all directly to the point. Verification of the deep interest shown is to be had from the animated discussion which usually follows all of the points brought out in the reading of the papers.

There are several more conventions scheduled to be held within the next few weeks and indications are that these also will be extremely well attended.

HELP FROM THE OUTSIDE

Just the other night in a small city near New York we attended a meeting of a local civic association. During the course of the meeting a question relating to public utilities arose and a member got on his feet and offered an explanation that contained facts and was extremely well presented. After the meeting we sought a talk with this man and we were impressed by his grasp on problems that we thought held little interest for the public. Here is the gist of what he said in reply to questions:

"About a year ago there came up an attack on the utilities of this community and the gas company started to explain its position. I was impressed by the facts and I dropped into the office of the company one day and sought more details. Then I learned a lot of things that I didn't know or even dream of. But I have been taking more or less interest in this subject ever since and I have read everything that has been published.

"Perhaps my case is exceptional but I want to say that the care with which the gas company prepared for the future development of the town convinced me that we are in pretty good hands and I have since purchased some property with the idea that the gas company is going to make it valuable for me some one of these days. That is one reason why I am interested in seeing that the truth is spread regarding the company and also because I hate to hear false statements made. And I don't think that I am very much different from any other business man."

This man went on to relate that he was particularly impressed by the fact that the statements and literature emanating from the gas company did not waste time in futile argument but rather presented the truth and allowed the customer to draw conclusions.

Now while we have chosen this one instance to discuss it is typical of the work that is being carried on throughout the United States by gas companies, through their own companies and also through membership in state bodies. The fact that the average business man depends on being able to obtain the truth in the operation of his own business should be a pretty good guide that he wants the truth regarding other lines of activity that so intimately affect him. We believe that the gas industry is on the right track in the work that is being done.

EXPERT TO WRITE FOR JOURNAL

The "American Gas Journal" has been able to add to its list of contributors Harold Leslie who will write on merchandising and advertising subjects, and who also has taken a commission from this magazine to spend much time in investigation work in plants outside of the industry but which are splendid prospects for large consumption of gas. Mr. Leslie is represented in this issue with his first contribution and he will be a regular contributor to these pages. Among other things that Mr. Leslie has undertaken is to learn from engineers and factory and production men just what they expect of fuel. Mr. Leslie probably will spend much time in those plants which do not use gas but he can be relied upon to ask the extremely important question: "Why can't you do it better with gas?" The replies that he obtains will be illuminating and should be of real service to the American gas industry. We believe that the "American Gas Journal" is increasing many fold the value of its service by contracting with Mr. Leslie for this work.

GASIFICATION OF LOW CALORIFIC COMBUSTIBLES

(Continued from Page 246)

on the other hand starts to produce gas under the same conditions of gasification at a temperature of 400 to 500 degrees C. The gasification of the waste materials, however, must not be continued at the low temperature throughout the entire process, for, if that is done, then certain gases, such as carbon dioxide, water vapor, etc., which are valueless from the standpoint of heat production, are formed. They are also produced when the garbage and other waste materials, which are used as raw materials in the process, are incompletely decomposed with formation of gas.

Commercial Aspects of the Process

The commercial aspects of the gasification of garbage and other waste materials depend largely on the aforementioned facts. The fact that the gasification can be carried out at a low temperature is a self-evident great advantage, for under these conditions little heating gas is consumed in the gasification process. Due to this fact, it is possible to carry out the decomposition of the raw materials by using the de-gased residues that are recovered in the process, without the addition of any other fuel, for the production of heating gas used in heating the retorts, when a part of the tar, produced in the process, is used in the gasification.

The heat balance of the process is given in the following. The gasification is carried out at a temperature of 500 degrees C. The results that were obtained in the experiments are used as the fundamental data for making the calculations. About 1,000 kilograms of the raw materials were employed in the gasification process, and this material contained 28 per cent ash and 53 per cent water, according to analysis. About half of the ash in the waste material can be removed by sifting, which leaves approximately 140 grams of ash and 530 kilograms of water. From this mass there were obtained 210 kilograms of de-gasified residues, containing 70 kilograms of carbon. Furthermore, for simplicity sake it was assumed that the waste materials were dried at the average temperature of 125 degrees C. and that the steam was evolved at a temperature of 100 degrees C., so that it conferred part of its heat to the waste materials that it passed through. The dried mass, 330 kilograms, was then gasified at a temperature of 500 degrees C., and the decomposition products similarly yielded part of their heat to the dried waste materials. The gases were evolved at an approximate temperature of 125 degrees C. Finally the degasified residual matters were then introduced into the gas producer at a temperature of 375 degrees C.

The Heat Balance

The consumption of heat is divided up into eight parts according to the following:

1. Heating 530 kilograms of water from 15 degrees C. to 100 degrees C (330×85), 45,000 calories.
2. Evaporation of the water (530×565), 299,450 calories.
3. Superheating the steam from 100 degrees C. to 125 degrees C., recovered.
4. Heating of 270 kilograms of dry material from 15 degrees C. to 125 degrees C. (330×0.2×110), 7,260 calories.
5. Superheating of the steam and gases, which are evolved from the dried mass from 125 degrees C. to 500 degrees C. (about 22,500 calories recovered).
6. Heating the 210 kilograms of degasified residues from 125 degrees C. to 500 degrees C. (15,750 calories recovered).
7. For the chemical decompositions which take place in the gasification, 50 per cent of the last three heat values, amounting to 45,510 calories, 22,755 calories.

Total, items 1 to 7, 374,465 calories.

8. Loss due to radiation, etc., 15 per cent, 55,647 calories.

Heat consumption in all (374,465 + 55,647), 430,112 calories.

From 70 kilograms of carbon in the de-gasified residues, there are obtained, on the assumption that the efficiency is 70 per cent, about 430,000 calories; to this figure there must be added the quantity of heat, that is obtained from the tar, which is recovered in large quantities, and which is mixed in part with these residues.

Interpretation of the Calculation

Hence the calculation shows that the gasification of waste materials, containing the large proportion of 53 per cent water, with the use of the degasified residues and a certain portion of the tar that is formed and recovered in the principal part of the process, consequently when just the waste materials themselves and the products derived from them are used in the process, it is seen from this calculation that the gasification of the waste materials is theoretically possible when considered from the standpoint of heat economy. However, the exact data on the gasification must be derived from experimental work in an experimental gas producer or furnace.

If the heat calories that are present in the degasified residues and in the tar are utilized in a specially constructed apparatus, nevertheless, nothing will be gained unless these heat masses are rendered available. Hence, the de-gasified residues must be usable. It is therefore of the highest importance, as far as the practical application of this process of gasifying waste materials is concerned with the utilization of the degasified residues and a little tar, that the former can be employed in the production of the gas that is used in heating the generating apparatus. If for one reason or another, the degasified materials are not available for conversion into heating gas, and if for that reason other fuel must be burned in order to carry on the gasification operation, then the process becomes particularly uneconomical.

If it is assumed, as above, that 430,112 calories are required for the gasification of 1,000 kilograms

of waste materials and that there are obtained therefrom, as indicated in the experimental work, 25 cubic meters of gas with a total heat value of 95,500 calories, that it is necessary to use a special fuel for the production of the 430,112 calories, that are required for the gasification process, in order to recover only 95,500 calories in the gas evolved, then it is evident that there is no economy in the process. However, if it be possible to utilize the de-gasified residues for gas making purposes, then the process becomes decidedly advantageous. In this respect it may be mentioned that the net consumption of heat units is less in this process than in any of the common gasification processes in use at the present time.

Utilization of the De-Gasified Residues

The production of heating gas from the waste materials themselves for heating the retorts is hard to carry out because of the small gas yield and the small heat value of such gas. As, however, the commercial possibility of using this process of making gas from waste materials is dependent on the applicability of the degasified residues for the production of heating gas, hence the question as to how much and what quality of gas can be obtained from these residues is of prime importance. On superficial examination the degasified residues appear to be about the poorest possible material from which gas can be generated. The regular gas producers require a material which is in the form of lumps as far as possible and which is also as solid as possible, in order to operate properly. The resistance of the fuel bed to the passage of air required for the combustion of the fuel must not be too great. When the fuel is in too compact a bed, the generation of producer gas is made considerably more difficult, due to the pressure which acts against the gas and also to the fact that there is not perfect contact between the combustible and air.

The degasified residue, which is obtained from this process, is a loose, light, very dusty mass, consisting of the carbonized organic constituents of the refuse materials and of a large proportion of ash. It is not suited for conversion into gas without further treatment. The idea is suggested of making use of just this loose, light character of the mass to bring about its gasification. When refuse material, as coarsely constituted as possible, containing a slight amount of ash, is gasified without the addition of any other substances, then, as experiments have proven, there is obtained a residue, which is loose and slightly dusty, but which possesses a certain degree of rigidity. Such a mass does not settle down to a compact layer in the producer and consequently the pressure which opposes the evolution of the gas is not too great. The use of refuse materials as fuel for the generation of gas is, however, limited to coarsely constituted materials. Furthermore, it is well to sort out of the mass all those materials which are not well suited for conversion into gas. The degasified residues must be mixed with tar and pitch and compressed into solid bricks before being used as a producer fuel.

Operating Details of the Gasification Process

The first step is to pre-dry the refuse materials, garbage and other similar raw materials by utilizing the waste heat in the flue gases. Then the mass is dried still further in an iron retort of cylindrical form. The material passes through this retort in a continuous stream, and gasification takes place therein as well as drying. The gasification retort may be directly connected to the drying retort. The latter is provided with a screw conveyor which rotates on a hollow shaft, through which the gases which are produced in the gasification retort, as well as the steam evolved from the drying of the materials in the same previous to their conversion into gas, are passed so that they give up part of their heat to the raw materials in the drying retort and assist in the drying of the same. At the same time the drying retort is heated by the flue gases externally, as mentioned above. The feeding of the raw materials into the drying cylinder is accomplished by hand, the material being stored in a box, located above the retort a little to one side. The box is provided with a tight-fitting cover and a damper. After the damper is opened the raw materials are forced out of the box by mechanical means, so that they fall on the screw conveyor and are carried along in the retort. The box is also provided with an opening on top which can be opened and closed and through which the raw materials are fed into the box. After the raw materials are removed the damper is again closed. In this manner the sucking-in of air is avoided during the loading operation.

The paddle wheels of the screw conveyor are perforated, so that the steam and oven gases are permitted to rise easily. The steam, which is driven off from the raw materials during the drying process in the drying retort, is conducted through a special pipe under the grate of the producer. The shaft of the screw conveyor is lengthened at top and bottom. Towards the bottom it reaches up to the part which is beyond the heating zone; that is, the part of the gasification retort which is directly connected underneath with the drying retort. The shaft is provided with stirring rods or paddles as it passes through the gasification retort, so that the raw materials are kept in motion during the gasification process. This avoids an overheating of the walls of the retort.

The lower part of the drying retort, that is, the part which lies nearest the gasification retort, is contracted so that the raw materials are subjected to a compression action as they pass through the constriction. The compressed mass is better suited for gasification. At the upper part of the screw conveyor shaft there are connected the usual pulleys, etc., for driving purposes. The shaft is carried on two bearings, one of which is located outside of the drying retort and the other in the lower part of the same. A part of the tarry constituents distilled out of the waste materials is condensed in the hollow shaft, through which the hot gases and steam from the gasifying retort pass and impart part of their heat to the drying raw materials in the drying retort. This tar flows back and is mixed

with the de-gasified residues in the gasification retort. Furthermore, additional tar and pitch mixture is fed into the hollow shaft through a special opening. The gas pipe, a regular hydraulic main, is connected to the very top of the shaft. In the lower part of the gasification retort beyond the heating and gasification zones of the same there are arranged a number of forks or prongs which are rotatable. By means of these the de-gasified residues are moved along and comminuted, whereat they are mixed with the tar and pitch which flows out of the hollow shaft and finally fall to the bottom of the retort. The residues fall directly into a cylinder, which is provided with pistons which compress the residues automatically and continuously and deliver them to a producer. For this purpose an open cylinder is connected to the lowest contracted part of the gasification retort, that is, this cylinder is opened towards the retort. The forward moving piston shoves the de-gasified residues mixed with the tar into the cylinder and moves towards a second piston, which is provided with springs. The latter is accordingly pressed back and is held fast at its outermost position by means of a latch and pin device. The compressed residues are then found over the top opening of a producer.

Further Details of the Apparatus

A simple arrangement, which is connected with the piston rod of the first piston and which is actuated automatically, is provided for the purpose of assuring a sufficient back motion of the second piston under all conditions, so that it engages with the latch arrangement. At this moment the compressed mass must be pushed forward into the generator by means of an arrangement of special construction which is provided with a spring. As the first piston moves back this arrangement must be drawn up again automatically and the latch arrangement, which held back the second piston, must be loosened automatically, so that the second piston is moved back again to its outermost position. The process of introducing a new quantity of tar-mixed residue into the cylinder, compressing it and pushing it into the generator, is repeated.

In this manner the de-gasified residues, which are produced in the lower gasifying retort, are rendered available for conversion into gas in the gas producer and accordingly it is possible to carry out the entire operation with materials that are produced and recovered from the original raw materials themselves. The degree of the compression, to which the tarry mixture is subjected, can be regulated by means of a spring which is located behind the second piston. Likewise, the quantity of the worked-up residues can be regulated in an accurate manner, by causing the first piston to move faster or slower, according to which more or less raw materials are gasified, which can be moved forward by the screw conveyor in the drying retort at a greater or lesser speed in accordance with the rapidity of the drying. Furthermore, the amount of tar and pitch that is added to the de-gasified residues can be controlled according to the exigencies of the occasion. In the place of the tar, which is recovered in the gasification process, which is similar to low temperature tar in its properties, it is possible to use to good advantage the less expensive, common gas tar. The temperature with the retorts is controlled by means of thermometers, and similarly the pressure is controlled by means of manometers, in order to avoid undesirable infiltration of gas. The apparatus can therefore be accurately adjusted, so that it works perfectly satisfactorily in accordance with the properties of the raw materials employed, and after this has been done it will work thereafter almost absolutely automatically, so that very little labor is required to operate the process. This is a very important point and shows up the process very well, in consideration of the fact that large masses of wet materials, which produce comparatively little gas, are used in the gasification.

It might be mentioned at this point that the final ash, recovered from the gasification of the mixture of de-gasified residues and tar and pitch in the producer, contains valuable mineral salts and can be utilized to good advantage as an ingredient of fertilizing compositions. The gas that is produced may be mixed with coal gas and the mixture used as illuminating gas. When this practice is carried out, the gasification apparatus may be erected right in the retort house of the gas works and the gas produced may be led directly in the gas line, carrying the coal gas product. Under these conditions special apparatus for the purification of the gas is not necessary, and the heating or lighting value of the garbage gas is improved to a considerable degree by the absorption of the carbon dioxide contained in that gas by the ammonia which is present in the unpurified coal gas. In this manner there is likewise produced an improvement in the heating value of illuminating gas which is now impaired by the addition of water gas. Then again the garbage gas can be passed through towers, which are irrigated with gas liquor, to which a certain amount of concentrated gas liquor, poor in carbon dioxide, has been added. The ammonium carbonate produced possesses fertilizing value.

In so far as illuminating gas is concerned the following practice may be carried out: After the reduction of the carbon dioxide content to about 10 per cent, the 2,500 cubic meters of gas that are obtained from 100 tons of waste materials may be mixed with 7,900 cubic meters of water gas, having a calorific power of 2,700 heat units. The mixed gas will then have a calorific power of 3,400 units. In order to obtain the same heating value in water gas by the carburation process, it is necessary to use about 1,430 kilograms of gas oil. This is saved in this case. The garbage gas, containing a large proportion of carbon dioxide and possessing a low calorific power, can find use as a power gas.

Syd's Scribblings

Society

Play a little bridge-whist,
Have a têté-à-têté.
Eat a lettuce sandwich
From a silver tray.
Say you've had a jolly time
As you say good-bye,
Now isn't that exciting sport
To tempt a healthy guy?

* * *

Ritzy

Charley Aarons, of the Walker-Pratt Co., says that there is some foundation for the universal opinion that Boston people are "high-brow".

Charley was paying a visit to the huge country estate of one of his friends. His hostess told him they had their own cattle and horses and pigs and hens.

"Hens," said Aarons, "and they lay fresh eggs for you!"

"I don't know," was her frigid response, "of course our hens can work if they want to, but situated as we are, it really isn't necessary."

* * *

Front

A wealthy man
Can afford to look
Like an old scare-crow
From a kiddies' book.
The chap who's broke
And out of a job
Can find no place,
Looking like a slob.

* * *

And Some of Them Live

J. Groble, of the Reynolds Gas Regulator Co., Anderson, Ind., was in an "Appliance Showroom" when a country woman came in.

"Is them the stoves that don't need no coal or no wood?" asked the woman.

"Yes," answered the clerk.

"Looks pritty, don't it, what's it worth?" asked the woman.

"Seventy-five dollars," answered the clerk.

"That's pritty dear," said the woman.

"Not at all, madam," said the clerk. "This range will last for years, no repairs, no expensive fuel and then think of the convenience."

"Will you set it up for me?" asked the customer.

"Certainly, we'll install it, without charge," answered the clerk.

"And it won't never cost me nothing after that?"

"Nothing," answered the clerk, "except your gas bills."

"Oh," said the woman, "I thought there was a catch in it somewhere."

* * *

SOME men are poor,
LOTS of them are stupid,
MOST of them are ugly,
ALL of them are conceited,
EVERY one of them, however,
SOME WOMAN thinks is indispensible.

* * *

Dangerous

Billy Knight, Cleveland Gas Meter Co., says Cleveland is a fast town. There is a great deal of reckless automobile driving, and one of the most reckless is a physician, a friend of Billy's.

One day the doctor's phone rang and a woman's voice asked him if he had any calls to pay that afternoon.

"No; I hardly think I will go out this afternoon," replied the doctor. "But why do you ask?"

"Well," replied the voice, "I want to send my little daughter out to do a little shopping, if I'm sure you're not out in your car."

* * *

The Three

The happiest days
Of a man's life are:
When his engagement is announced,
His marriage vows pronounced
And his divorce denounced.

Sherlock Holmes.

Harry Christmas, of Wm. M. Crane Co., has established quite a reputation as an amateur detective. One of his employees came to him for advice. He had received a Black Hand letter which read:

"If you do not give $1,000 to our messenger, who will call on you tonight, we will kidnap your wife."

"Well," said Christmas to the workman, "what have you done about it?"

"Nothing, sir," said the man, "except answer the letter."

"What did you write?" asked Christmas.

"I wrote," said the man, "I haven't got $1,000 but your proposition interests me."

* * *

A FISHY CAT STORY

Cat Paws a Gas Cock Open and Two Are Suffocated

Boston.—Mike, a pet maltese cat, prowling over the gas range in the kitchen at 42 Whitney St., Roxbury, early today, pawed open a gas cock. As a result Mrs. Catherine McManus is dead and her husband John McManus, is dying.

A roomer in the McManus home smelled gas and notified the police. They found Mrs. McManus dead and the husband was taken to a hospital unconscious. Near the range lay Mike, a victim of his own act.

Medical Examiner Brockley said that the cat apparently brushed against the burner while on his way to inspect the contents of a stew pan on the range.

Syd

Public Utilities Securities Market Report

Prices of Representative Gas Bonds

(Quotations furnished by The National City Company)

Company.		Maturity	March 22, 1923. Bid	Asked
American Lt. & Trac. Co.	Five Year 6s	May 1, 1925	108½	109½
Brooklyn Union Gas Co.	First Consol. 5s	May 1, 1945	96	97
Columbia Gas & Elec. Co.	First 5s	May 1, 1927	95¾	96½
Consol. Gas, Elec. Lt. & Pr. Co. of Baltimore	First Ref. 7⅛s	Dec. 1, 1925	110	111
Consol. Gas, Elec. Lt. & Pr. Co.	General 4½s	Jan. 1, 1935	91	92
New Amsterdam Gas Co.	First Consol. 5s	May 1, 1948	79½	81½
Denver Gas & Elec. Co.	Gen. (now 1st) 5s	Jan. 1, 1949	93½	95
Detroit City Gas Co.	Gold 6s	Jan. 1, 1947	100	100⅜
Equitable Illum. Gas Lt. Co. of Philadelphia	First 5s	Jan. 1, 1928	101½	103
Hudson County Gas Co.	First 5s	Nov. 1, 1949	94⅛	—
Laclede Gas Light Co.	Ref. & Ext. 5s	Apr. 1, 1934	94⅞	95¼
Louisville Gas & Elec. Co.	First & Ref. 7s	Called Dec. 1	100	—
Michigan Light Co.	First & Ref. 5s	Mar. 1, 1946	89½	91½
Milwaukee Gas Light Co.	First 4s	May 1, 1927	94	94½
Pacific Gas & Elec. Co.	Gen. & Ref. 5s	Jan. 1, 1942	90	90½
Pacific Gas & Elec. Co.	First & Ref. 7s	Dec. 1, 1940	106½	108
Cal. Gas & Elec. Corp.	Unif. & Ref. 5s	Nov. 1, 1937	96	96½
Peoples' Gas Lt. & Coke Co.	Refunding 5s	Sept. 1, 1947	90	90½
Chicago Gas Lt. & Coke Co.	First 5s	July 1, 1937	95¼	97⅜
Portland Gas & Coke Co.	First & Ref. 5s	Jan. 1, 1940	90	91½
Seattle Lighting Co.	Refunding 5s	Oct. 1, 1949	82	84
Southern California Gas Co.	First 6s	Nov. 1, 1950	98	99½
Utica Gas & Electric Co.	Ref. & Ext. 5s	July 1, 1957	91	91½
Washington Gas Light Co.	General 5s	Nov. 1, 1960	95	95½
Western States Gas & Elec. Co. of California	First & Ref. 5s	June 1, 1941	91	93

Louisville Gas and Electric Company Buys Site for New Gas Plant

Louisville Gas and Electric Company has purchased a 75 acre tract of land on the Ohio River, just east of Louisville, on which the company soon will begin construction of a new water gas manufacturing plant. This plant, it is believed, in addition to the company's present facilities, will make ample provision for the gas requirements of Louisville for some time to come.

The new plant will be designed in such a way that its capacity may be increased at any time.

Delegates to the Natural Gas Association of America convention, to be held in Louisville during the week of April 16, will be guests of Louisville Gas and Electric Company and visit the company's plants. Under the direction of Donald McDonald, president M. W. Walsh and other executives of the company, an elaborate program is being planned for the delegates and exhibitors.

Big Increase Shown in Gas Company Receipts

Dallas, Tex.—An increase in profit of approximately $10,000 was made by the Dallas Gas Company during December over the total for November, the monthly report of F. B. Sims, accountant for the supervisor of public utilities, shows.

The authorized return and balance for reserves in December was $37,233.04, against that of $27,-964.88 for November. Gross earnings in December were $255,737 and in November were $171,329. Operating expenses in November were $143,364, while in December they were $218,504.

Lower Rates for Westfield, Mass.

Reduction in the price of gas will become effective April 1 in following with plans of the Municipal Light Commission. It has been stated by Chairman Lewis C. Parker that the commission had been considering a reduction and in view of the excellent business year the department has experienced, it was believed advisable by the commission to reduce the price on both gas and electricity. Under the new rates, gas will sell for $1.75 a thousand feet instead of the present rate of $1.90.

"Prosperity"

A. S. Seymour, secretary of the Chamber of Commerce, of Washington, D. C., says:

"I believe that a city is largely known by its public utilities, and you can not build up a city if you attempt to cripple or injure any of those utilities. The stranger in our city who uses our street railways gets his impression of our city from the service he gets on those railways, and for that reason we insist that we have good service, and that in order to get it we must have prosperous utilities."

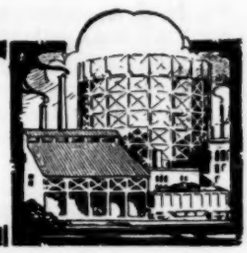
Improvement at Gas Plant to Start Soon.

Washington, O.—According to announcement from the plant, work on the improvement of The Washington Gas & Electric Company will be started about the first of April.

The new building will be erected on the lot on the east side of the present plant.

Indications are that the new brick stack will be begun about the same time.

NEWS OF THE GAS INDUSTRY



ILLINOIS ASSOCIATION HEARS PLAN FOR UTILITY COLLEGE COURSE AT ANNUAL CONVENTION

The Nineteenth Annual Meeting of the Illinois Gas Association was held in conjunction with the Illinois State Electric Association and the Illinois Electric Railways Association, at the Sherman Hotel, Chicago, March 14th and 15th.

General sessions were held in the forenoon and each association held separate meetings in the afternoon. The general session on Wednesday was devoted to "Public Utility Education at the University." The first speaker was Charles M. Thompson, Dean, College of Commerce and Administration, University of Illinois. He outlined plans being formulated to include in the curriculum a course which might be termed fundamental economics of public utilities, including administration, finance, engineering and management. Dean Thompson pointed out that the conditions surrounding the average mercantile or manufacturing business did not apply to any great extent to the utilities, and this course was to fit the students desiring to take up work with a utility, and to give them a better understanding of the economic problems they would be confronted with in the utilities.

Ralph E. Heilman, Dean, School of Commerce, Northwestern University, stated that they had a program of education for utilities, and suggested that it would be advantageous if such courses were established in all local educational institutions, all with the same courses of study, not only for the day students, but for the men already engaged in various kinds of utility work. He stated that these courses would tend to professionalize the whole utilities industries, lessen criticism, promote good management and encourage research in the various problems of the utilities.

Martin J. Insull stated that in his opinion the most important problems confronting the utilities today was finance and administration. He said that engineering research was bound to go on, but that there was today sixteen billions of dollars invested in utilities in the United States, and that about one billion of new securities were put out each year, at least half of which went into extensions and improvements, and part for refurnishing, and that the executives were the trustees for the money of thousands of investors, and that the business should be administered by trained minds.

D. W. Snyder suggested that the utilities should agree to take a certain number of students into their organization after they had graduated, and give them a two years' course in practical work. By the end of that period, each one would have found what special sort of utility work he was best fitted for and could be put in that department.

It was the unanimous opinion that these courses would be of great benefit to the utilities in many ways.

The first paper read Wednesday afternoon in the gas section was "The Uniform Classification of Accounts—What It Means to Utility Operators," by M. F. Reeder, of the Peoples Gas Light & Coke Co.

J. D. Capron, of the United States Cast Iron Pipe & Foundry Co., of Burlington, N. J., presented a moving picture showing the manufacture of cast-iron pipe, both by the old method of casting in sand and the new centrifugal method.

The banquet was held Wednesday evening. Charles A. Luther, Chairman of the Entertainment Committee, supplied the usual high class diversions.

The Thursday morning session was general, and talks were given by E. W. Lloyd, Chairman N. E. L. A. Joint Committee, and B. J. Mullaney, Director Illinois Committee on Public Utilities Information.

At the afternoon session of the gas section, the following papers were read: "Housekeeping with Gas, Coal and Oil—a Seasonal Cost Comparison," by H. D. Valentine, Peoples Gas Light and Coke Co.; "Growing Industrial Gas Business in a Competitive Field," by Wm. D. Thompson, Indiana Natural Gas & Oil Co., and "Progress of Liquid Purification," by E. H. Bird, of The Koppers Co.

All of these papers were ably prepared and will be published in a later issue of the "American Gas Journal."

The new officers of the Illinois Gas Association for the coming year are: President, R. B. MacDonald, Moline, Ill.; Vice-President, John Larned, Public Service Co. of Northern, Ill., and Secretary-Treasurer, R. V. Prather, Springfield, Ill.

Sprague Meter Co. to Increase Plant

The Sprague Meter Co., Bridgeport, Conn., has recently purchased a plot of ground adjoining their present plant.

The plot is 205 ft. by 80 ft., and erection of an addition to their plant will soon be started. This is the second piece of property adjoining their plant purchased within one year.

Pa.-N. J. Associations Meet in April.

Announcement has been made of the joint annual meetings of the Eastern States Gas Conference, New Jersey Gas Association, and the Pennsylvania Gas Association on April 11, 12 and 13. The meetings will be held in the Bellevue-Stratford Hotel, Philadelphia.

A most pretentious program has been arranged, according to advance announcements, and includes business meetings, election of offices and committees' reports on Wednesday, April 11. Thursday, April 12, will be "All Gas Men's Day," when timely subjects will be presented by prominent speakers and will be followed by discussions. On that evening will be held the banquet and seats have been provided for 1,000. Friday will be devoted to gas company managers and executives and there will be addresses by men of national reputation on vital problems of the gas industry.

Appoints New England Representative

The Eastern Service Company, of Boston, Mass., has been appointed as distributors for Kompak heaters for the New England territory. W. A. Devine, of the Kompak Company, will act as Eastern Sales Manager, covering the entire territory and will cooperate with the Eastern Service Company. The change has been made in order to care for the increased business of the Kompak Company in rendering service that hitherto has not been possible. It is believed that the entire trade will welcome this addition to Kompak service.

Who Will Pass the Cigars?

Mason City, Iowa.—The Iowa town or city which has enjoyed uninterrupted gas service for the longest period of years, will be awarded a prize at the annual convention of the Iowa District Gas Association, to be held at Mason City, April 18, 19 and 20. The prize, a box of cigars, will be awarded to the manager of the company from the lucky city, in the presence of the other delegates to the convention.

Answers to a questionnaire sent out by the Iowa Committee on Public Utility Information, are being received and give some interesting and startling data.

Gain of 2,500 Gas Consumers Made Last Year

Fort Worth, Tex.—A gain of 2,500 gas consumers was registered during the past year, according to O. K. Shannon, manager of the Fort Worth Gas Company.

That many additional connections, the big majority of them for homes, were made. It shows a steady growth for the city of Fort Worth, he declared.

The new consumers were not obtained by making extensions, but were connected with the lines already laid.

There are 25,000 gas consumers in the city.

The fact that the weather man failed to work in harmony with the gas man this past winter accounts for the decreased gross income of the gas company. It was less in 1922 than for 1921.

Reconstructing Purifying House

Springfield, Mass.—The Springfield Gas Light Company, West State street, is having plans prepared for the reconstruction of its gas purifying plant on Water street, which was recently destroyed by an explosion. The structure will be one-story high, about 60x100 feet, of brick and steel, and will cost about $65,000.

Extends Time for Organization

Terryville, Conn.—The Legislature during the past week adopted the resolution put before it by Representative Talcott, of Vernon, extending to 1925 the time for organizing the proposed Terryville Gas Company. The bill was taken up by Mr. Talcott and, after a little work on his part, it was adopted.

To Build Coke Ovens in Hamilton

The Hamilton By Product Coke Ovens, Ltd., of Hamilton, Ont., Can., have let contract to the Semet Solvay Company for building a byproduct coke plant at Hamilton to cost $2,500,000. The United Gas and Fuel Company of Hamilton will purchase the output of the gas plant, according to its president, P. V. Byrnes.

Renew Street Lighting Contracts

The Welsbach Street Lighting Company of America has announced that street lighting contracts with Buffalo, N. Y., and Yonkers, N. Y., have been renewed.

Holyoke (Mass.) Gas Dept. Shows Big Gain

The annual report of the Gas and Electric Commission which was presented to the Board of Alderman March 7th showed that the output of gas in 1922 exceeded all previous records. The gas sent out during the year amounted to more than 319,000,000 cubic feet which was the greatest amount ever sent out in any one year.

The net income from gas manufacturing account was $12,969.48.

The new equipment required at the gas works consists of a new station meter, new blower for the water gas set, coke handling and conveying machinery which will cost approximately $50,000.

In Memory of William J. Barker

February 15, 1922, William J. Barker, vice-president and general manager of the Denver Gas and Electric Light Company, died. February 15, 1923, the employees of the gas company from the highest to the lowest in rank, issued a handsome book, dedicated to the widow and his son.

On the front page is a likeness of "Bill" Barker, and Tennyson speaks: "God's finger touched him and he slept."

The book is filled with testimonials of the esteem in which all held him. Fitz Greene Halleck, quoted, says: "None knew thee but to love thee, nor named thee but to praise."

The entire book is built upon the lines quoted.

Kersting Appointed

A. F. Kersting, is the new manager of the Carolina Power and Light Co., Raleigh, N. C.

Announce Reduction in Rates

Concord, N. C.—The Concord & Kannapolis Gas Company announced that its rate on and after March 1 will be reduced 10 cents per 1,000 cubic feet.

John S. Palmer, manager of the gas company, stated that his company was the first in the state to make a voluntary reduction in the price of its gas. A similar announcement was made in Gastonia but the companies here and there are owned by the same capital, and the announcements are really for but one company.

Report on Study of Freeport Bed

Results of a microscopic study of the Freeport coal bed in Pennsylvania, made by Reinhardt Thiessen, research chemist, Bureau of Mines, and Anson W. gie Institute of Technology, show that the bone coal from this seam, which is now thrown away, compares favorably with the best grades of bituminous coal mined in some countries. This bone coal is capable of yielding valuable by-products and, as high-grade coal becomes scarcer, it should become a marketable product in the United States.

Messrs. Thiessen and Voorhees, in Bulletin 2, Coal-Mining Investigations series, issued under the auspices of the Carnegie Institute of Technology, the Bureau of Mines and an advisory board of coal mining operators and engineers, state further that, as oil becomes scarce, and more and more benzol is used, the cannel coal from the Freeport bed, which is now not mined, will be valuable, as upon distillation the yields from the cannel compare with the yields obtained from oil-shale.

As a result of this investigation, it appears that it will be only a matter of time before the entire Freeport seam will be mined from top to fireclay bottom, and the various portions used to greater advantage.

The investigation that formed the basis of this report is a very small part of the general program of research which is being carried on to obtain a better knowledge of the origin, composition, nature, and chemistry of coals in general. Some of the more specific aims of this problem are (1) to determine whether a coal seam varies in composition either vertically or horizontally, or if it is of uniform composition throughout; (2) to discover uses for those sections of the seam which are now being discarded; and (3) to try to find the relationship between the various constitutents of the coal and the products obtained by coking.

The thick Freeport coal bed is a phenomenon caused by an unusual thickening of the Upper Freeport bed, ranging from 5 to 11 feet in thickness in a proved area about 15 miles long by 8 miles wide, which is almost bisected by the Allegheny River, and contains 75,000 acres in Allegheny, Westmoreland, and Butler Counties, Pennsylvania.

The microscopic study of the Freeport coal bed was undertaken, for the purpose of obtaining accurate data on the structure of the various layers or benches of coal comprising the Freeport coal bed, and the correlation of this data with the yields of oils, tars, gas and coke obtained from those same sections of the Freeport coal bed by destructive distillation.

The thick Freeport coal bed was sampled at five mines, suitably situated in the area under consideration. Photomicrographs were made at regular intervals from the bottom to the top of the bed, including the bone and cannel constituents, and a number of the typical photomicrographs are reproduced in this report.

The investigation showed that the structure of the Freeport bed varies vertically, but not horizontally; that the lower benches are rich in anthraxylon the proportion of which diminishes towards the top of the bed, ending finally in a layer of cannel coal made almost wholly of attritus. The attritus is rich in oil and tar-producing constituents. The spore-exines of the Freeport bed are characteristic, and sufficient data have been obtained whereby the identity of this bed can be established in other localities by microscopic examination.

Uehling Appoints Representatives

The Uehling Instrument Company, Paterson, N. J., has just appointed two new agents, namely, John E. Arnold, 15½ South 4th Street, Tulsa, Okla., whose territory is the State of Oklahoma, and H. R. N. Johnson, 917-A Marquette Ave., Minneapolis, whose territory is Minnesota, North Dakota, and South Dakota. Both of these agents are well acquainted in the power plant field, and are thoroughly conversant with the problems necessitating the use of Uehling CO_2 recorders and other Uehling gauges. The Uehling Chicago agent, Walter C. Lange, 20 West Jackson Boulevard, recently returned to the Chicago territory after two months spent at the Paterson plant, assisting in the development of the new Uehling CO, or combustible recorder.

Maddux Joins Gas Company

O. L. Maddux, formerly covering Virginia and the Carolinas for the Humphrey Company, Kalamazoo, Mich., has resigned his position with that company, and is now with the United Chemical & Industrial Corp., of Philadelphia, who operate Concord & Kannapolis Gas Co., at Concord, N. C., and Gastonia & Suburban Gas Co., at Gastonia, N. C.

Mr. Maddux will be located at Gastonia and will be principally occupied in a campaign of promotion for both of these companies.

Companies Reduce Rates

Concord & Kannapolis Gas Co., and Gastonia & Suburban Gas Co., announce the first of a series of rate reductions by lowering their rate 10 cents per 1,000 cu. ft., effective March the 1st. It is planned to lower these rates as rapidly as possible. An announcement was made that further reductions are assured in the near future.

Reduce Rates in Birmingham, Ala.

Birmingham, Ala.—Gas rates in Montgomery, Ala., and suburbs will be cut in half on April 1 by the Alabama Power Company which has recently taken over all public utilities in that city. The public service commission has approved the new rate which includes a $2 service charge.

The reduction will be from $2.10 to $1 per thousand cubic feet for all consumers using 2,000 feet of gas or over per month. Officials of the power company stated that in taking over the Montgomery properties that gas consumption had gradually decreased during the last few years. They reached the conclusion that the gas rate fixed was too high and this was the cause for the reduction in the number of consumers.

The new rate will give Montgomery a cheaper scale than that enjoyed by any other Alabama city except Birmingham where by-product gas is used. The new rate, it is stated, will result in a material saving. In agreeing to the reduction the power company will suffer an intermediate loss of at least $2,500 per month but it is hoped to greatly increase the number of consumers.

An Exclusive Gas Appliance and Equipment Home Beautiful

There have been various "Home Electrics" staged in various parts of the country in the interest of the electrical industry, and which have proved of great benefit to that industry.

Realizing that the gas industry has very many attractive features and commodities and specialties for practical use in the home, the management of the American Home and City Beautiful Association Exposition to be held on the Million Dollar Pier in Atlantic City, June 16 to September 8, 1923, has arranged to erect a beautiful home in which gas will be featured exclusively in all essentials which are suitable for introduction and practical use in a home.

The exposition management also proposes to have the same Home Beautiful on exhibition during the coming convention of the American Gas Association Convention in Atlantic City next October. It is anticipated that this remarkable exhibit will be the greatest publicity and sales promotion opportunity of 1923 for the gas industry to introduce and popularize products of the gas industry.

The home, designed by a famous architect, will be a model of architectural achievement, and will represent the latest ideas in equipment, appliances and furnishings.

The following statement regarding the scope and advantages of the exposition has been supplied by the exposition management for the readers of this publication:

American manufacturers and distributors of products for extensive distribution, who are offered an opportunity to participate in the exhibits, include the following main groups: Public and private buildings, materials, equipments and furnishings; the City Beautiful, embracing municipal improvements, hygiene, sanitation, fire and accident prevention; pure food products, confections and beverages; the garden, seeds, supplies and horticultural accessories; art, sculpture and ornaments; musical instruments and reproducers; recreation, athletics, travel information, and a section for Radio; also one for toys and playthings for kiddies and the grownups.

To show contrast in modern and ancient civilization the exposition management will erect and completely furnish a modern "Home Beautiful," and will also reproduce a "House of the Ancients," as an example of a contemporary type of residence in vogue in the days of the Egyptian Pharaoh Tut-Ankh-Amen.

Management of the exposition is in the hands of A. Conrad Ekholm, exposition manager, former president of the Avenue Hotel Association of Atlantic City, and director of many expositions in the resort. It is under the auspices of the American Home and City Beautiful Association, with the two-fold object of encouraging the use of products of American manufacture and education of the public in home and city beautification.

The Exposition will open June 16th, and continue until September 8, 1923, throughout Atlantic City's great summer season when transportation officials estimate that over ten million people visit the resort.

All of the exhibit floor space of the Million Dollar Pier, America's finest and largest exhibition structure, in excess of 100,000 square feet, has been engaged for this exhibit, which will rival the greatest of those of European countries. It offers unexcelled advantages to American manufacturers to simplfy their distribution and sales problems, to introduce and popularize their products, stimulate sales and enlarge their markets. They will be enabled to reach the buyers and merchants of their products who come to Atlantic City in great numbers, as well as the ultimate consumers. Orders may be taken for goods in a wholesale as well as retail way for delivery to any destination, and owing to the great remunerative possibilities to exhibitors, the event promises to be highly profitable to all who participate.

Leading industrial concerns are taking keen interest in the coming exposition because the project is in line with modern methods to promote industrial progress of the nation and it is generally recognized that there is no better place than Atlantic City for an exposition of this nature for reaching all classes with whom they seek to transact business and in greater numbers, including the consuming public, buyers and merchants, than can be reached anywhere else or by other methods at the same extremely moderate cost.

The exposition management offers to send an Exposition Folder and floor plan free to any one interested who will write to A. Conrad Ekholm, manager, American Home and City Beautiful Exposition, Million Dollar Pier, Atlantic City, N. J.

United Ntaural Gas Co. Doing Educational Work Among Employees.

A series of meetings of the employees and officers of the United Natural Gas Company are being held to further educate members regarding company affairs, the first being at Brookville, Pa.

Meetings are being held by the company at each of its plants this winter. The meetings are the result of a series of questions that were sent in by employees; fitters, meter readers, agents and clerks. These were questions that were asked them by consumers and questions that arose in the minds of the employees themselves, and for which they were unable to give satisfactory answers.

Realizing the situation demanded some educational work in order that the employees might be better prepared to meet the public, and to impress upon the employees their relation to the public and the important part they play in creating a sentiment for or a feeling against the company, it was decided to carry on these meetings all winter, having a meeting about every two weeks in each of the city plants.

It appeals to the officers of the company as being a good form of advertising and it is getting direct results with consumers.

P. G. & E. Had Good Year

San Francisco, Cal.—The Pacific Gas & Electric Corporation finished the year with approximately $11 a share for the average amount of common stock outstanding on December 31, 1922, according to a report emanating from the offices of that utility here. The showing which the company has made thus far warrants the increase in the dividend rate on its common to 6 per cent cash, plus the additional 2 per cent stock dividend.

The company is doing a record business, and in a period of four months added 24,000 new customers to its service, making the total number served up to November 30, 1922, 640,117.